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### TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. TC 1.1 DATE 26 June 2023

TC/TG/MTG/TRG TITLE Thermodynamics and Psychrometrics

DATE OF MEETING 26 June 2023 LOCATION JW Marriott Tampa, FL

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Omar Abdelaziz	2019	Ayyoub Momen	2019	Hongmei Liang (Remote)
Vikrant Aute	2019			Riad Assaf (Remote)
Harshad Inamdar	2019			Roy Crawford
Kashif Nawaz	2019			Deba Maitra
Stanislav Perencevic (NQ) - Remote	2019			SA Sherif
Raymond Rite	2022			Andrew Hjortland
				Khalid Saleh
				Stephen Duda
				Harshad Inamdar
				Jason T. LeRoy
				Liping Liu
				Tyler Stiles
				Jason Vandever
				Jian Sun
				Stephanie Gonzalez
				Hannah Hargrove (Remote)
				Jordan Morrow (Remote)
				Khaled Sach (Remote)
				Muneeshwan (Remote)
				Raisa Nekhaeva (Remote)

**DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:**

TAC Section Head: Jason Atkisson	SH1@ashrae.net
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	See ASHRAE email alias list for needed addresses.
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

**MINUTES: ASHRAE TC 1.1, Thermodynamics and Psychrometrics**  
**26 June 2023, 1:30pm – 3:30pm (EDT)**  
**JW Marriott Tampa, Howard (3)**  
**Tampa, Florida United States of America**

- Call to order at 1:42PM EDT by Ray Rite.
- Quorum established, 4 of 5 voting member present, 1 Non-Quorum
- Announcements (Kashif)
  - Ray Rite won distinguished member award.
  - Li Ping Wang – Crosby field award.
  - Vikrant Aute – Exceptional service award
- ASHRAE Code of Ethics Commitment (Rite)
- Review/Approve minutes from Atlanta meeting (Rite)
  - Motion to approve minutes (Omar/Harshad): 4-0-0-1-CV

***Section Head Comments (Corey Metzger)***

New liaison will be rolling on after meeting (Jason Atkisson).

Roster information is correct.

New standing committee GTIC – group focused on working with standards at the global level: 205, 163

Roster update with webmaster, will be updated.

***Liaison Comments (Research/Standards/Programs)***

Sonya, Handbook Liaison, updated technical committee. Handbook chapters are due soon.

Deadlines: Chapter 1 – 3/1/2024

Chapter 2 – 7/28/2024

***Research SC report (Kashif Nawaz):***

Research Breakfast:

- Activity, 0 RTAR reviewed, 6 WS reviewed, 1 accepted with Comments
  - 0 RTAR is alarming
- 1 Project in TC 1.1 concluded. Need to initiate activities
- RAC membership
  - Potential change for, Srinivas Katipamala will be new RAC Liaison
  - Current liaison has put notes in Basecamp and should smooth transition to new liaison
- Awards
  - 5 awards and grants, no nomination for service to ASHRAE research, follow up with Ray to tally points to determine eligibility
  - Grand-in-Aid – 43 applicants, 20 candidates selected
  - new investigator award – Davide Ziviani awarded, thermochemical heat pumps
    - which TC will be involved? sounds like TC 1.1 should be involved
    - Kashif will follow-up with RAC to determine if TC 1.1 can be involved
- ASHRAE Budget
  - trend is increasing, \$0.5M higher this year
- Maximum amount of project award
  - What should be an ideal budget? Agreement that amount should be increased.

- One potential resolution, candidate bidding for project should look for other resources / cost-share
- No intention to increase amount at this point.
- Project Monitoring Training session training in July timeframe
- PTAR – Publication Topic Acceptance Request – process will be formalized with review process. Certain topic areas where voluntary services are not enough, PTARs can help bridge this gap.
- Do we need transport properties for H<sub>2</sub>/CH<sub>4</sub> mixtures? Ray will take charge on this effort.
- Thermodynamic study for heating methods using H<sub>2</sub> could be performed including lifecycle analysis (co-sponsored by 6.10)
  - Green hydrogen, lifecycle calculation of overall energy consumption
  - Two-step :
    - Scoping study Lifecycle comparison from renewable energy to heating in cities in climate zone
    - Thermodynamics of renewable energy to hydrogen conversion
- Keep an eye out for topics we can co-lead with other TCs
- ASHRAE RP-1485 “Thermodynamic Properties of Real Moist Air, Dry Air, Steam, Water, and Ice”:
 

Error in the second derivative of the ideal gas portion of the dimensionless Helmholtz energy with respect to tau (equation 2.10)?

  - There is an amended version of the report? May or may not be using the correct version.
  - For the library itself, there have been several versions over the years.
  - There are other updates to the software / equations that are not updated in the report.

#### ***Handbook SC report (Riad Assaf):***

Ready to communicate chapters to TC.

- Chapter 1, Editorial question (typo), expect resolution within week.
- Ray mentioned he has been contacted about typos and forwarded on to Riad.
- Chapter2, Resolve issue about cascade systems since its included in other chapters of handbook. No need to add to chapter 2. Discussion between Harshad and Ray, Riad.
  - Share progress report next week.

#### ***Program SC report (Omar Abdelaziz):***

No programs at current meeting.

Ideas:

- Thermodynamics of drying
- lifecycle assessment of technologies
- Thermodynamics of refrigerants for winter meeting
- Separation and Dehumidification
- **Not-in-kind technologies (annex 53) for Chicago**
  - Radermacher / Fricke, operating agent (Annex 53)
  - Omar will talk with Brian Fricke
  - Proposed Seminar Title: Taking the Refrigerant out of Refrigeration
    - *Motion to Approve: Vikrant/Harshad; Passes 5-0-0-1-CV*
- Ultra-low refrigeration
- **High temperature heat pumps (Annex 58),**
  - lots of papers at IEA heat pump conference
  - Ray Rite will be session chair,
  - Kashef has potential speakers for session, liaison, Stanislav may have a presentation

- Proposed Seminar Title: How High Can You Get with Heat Pumps (Ray may modify title as he sees fit)
  - *Motion to Approve: Omar/Stanislav; Passes: 5-0-0-1-CV*
- New Idea: Thermodynamic property measurement techniques – Vikrant
  - 2 Japanese researchers may be interested
- **Dehumidification and Absorption Technologies**
  - Kaust, encapsulate silica, 6x better water absorption, absorption curves for new materials, about thermodynamics of material and systems integration
  - metal organic framework, Menghao Qin at DTU

Deadline August 2 for submission.

### ***Standards SC report (Roy Crawford):***

- Meeting later today, there will be a meeting this afternoon at 5pm.
- New liaison
- discussed workplan update. Roster issue, not out of balance.
- Working on draft diligently.
- there are issues with the implementation.

### ***Webmaster report:***

- New webmaster, need an emergency roster update.

### ***MTG Low GWP (Ray Rite):***

- 1 outstanding research project,
- 3 programs being sponsored
  - Standards and code changes seminar
  - Sensors
- Co-sponsor optimization of refrigerant compounds – McLinden
- PFAS discussion, looking to organizing a program

### ***Old Business:***

- Understanding Psychrometrics, 3rd Edition. Conclusion attached.



RE ASHRAE TC1.1  
Publications (Under:

- Feedback on refrigerant as part of system
  - Individual concerned that refrigerant is not listed as a component of the system.
  - Ray Rite crafted an email explaining the discussion attached here.
  - have not received any response.



RE Refrigeration  
Cycle.msg

### ***New Business:***

- Cognizant TC on Psychrometric Analysis CD, Professional Edition, Version 7
  - ASHRAE Staff contacted, ASHRAE wants a web version. Just a notice of intent.



RE ASHRAE TC1.1  
Publications (Psych /

– See attached for e-mail in reference.

***Chair comments:***

- Ray talked through a few notes from the chair breakfast discussions. Slides on Decarb and future program track and dates attached here.
- Govt Affairs committee update, see attachment.



CEC Notes for TC  
Breakfast.docx



TFBD Tampa TC  
Breakfast Slides.pdf



GAC Alice Yates.pdf

- Next meeting: Monday, 22 Jan 2024, 1:00-3:00 PM CST, Chicago, Illinois (Tentatively)
- New time proposed: 1:00 – 3:00 pm, works for those in room
- Adjourn: Omar/Harshad

Minutes: A. Hjortland/Rite